# 431-623 Broadband Networks

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| **Credit Points:** | 12.50 |
| **Level:** | 9 (Graduate/Postgraduate) |
| **Dates & Locations:** | 2009,<br>This subject commences in the following study period/s:<br>Semester 1, - Taught on campus. |
| **Time Commitment:** | Contact Hours: 3 hours per week; Non-contact time commitment: 84 hours Total Time Commitment: Not available |
| **Prerequisites:** | None |
| **Corequisites:** | None |
| **Recommended Background Knowledge:** | None |
| **Non Allowed Subjects:** | None |
| **Core Participation Requirements:** | For the purposes of considering request for Reasonable Adjustments under the Disability Standards for Education (Cwth 2005), and Student Support and Engagement Policy, academic requirements for this subject are articulated in the Subject Overview, Learning Outcomes, Assessment and Generic Skills sections of this entry. It is University policy to take all reasonable steps to minimise the impact of disability upon academic study, and reasonable adjustments will be made to enhance a student's participation in the University's programs. Students who feel their disability may impact on meeting the requirements of this subject are encouraged to discuss this matter with a Faculty Student Adviser and Student Equity and Disability Support: <a href="http://services.unimelb.edu.au/disability">http://services.unimelb.edu.au/disability</a> |
| **Coordinator:** | Mr Mohammad Amin Dallaali |
| **Subject Overview:** | This subject will provide students with a description of state-of-the-art technologies for broadband networking.<br>“Broadband Networks” subject will start with a brief description of Synchronous Digital Hierarchy as a foundation of broadband transmission systems. It will continue with the description of the major concepts of ATM, the physical layer and ATM layer, ATM signalling and routing, and the ATM traffic management functions. This subject will address new transmission systems including Gigabit Ethernet. Ethernet is displacing SDH in metro networks as a more cost effective broadband data solution.<br>The main focus of the subject would be on the MPLS technology. It will provide a brief history of label switching and architectural issues that pertain to the whole area of label switching, a detailed description of IP switching and tag switching, MPLS core protocols, quality of service (Integrated Services, Differentiated Services and MPLS support of Diff-Serv), constraint-based routing (RSVP extensions, CR-LDP, OSPF and IS-IS extensions and comparison of CR-LDP and RSVP), application of MPLS to traffic engineering and Virtual Private Networks (addressing the scalability, security and QoS support issues and building VPNs using MPLS). The subject will conclude with examples of how IP services are implemented over other transport technologies such as ATM and Multi-Protocol Label Switching (MPLS). |
| **Objectives:** | This subject will provide students with a description of state-of-the-art technologies for broadband networking with a focus on the Asynchronous Transfer Mode (ATM), the Internet Protocol (IP) and basically Multi-Protocol Label Switching (MPLS) as a solution for next generation broadband networks. Some basic objectives are itemised bellow:<br>• Brief review of SDH;<br>• Description of ATM: the physical layer, ATM layer, ATM signalling and routing protocol (PNNI), and the ATM traffic management functions;<br>• Basic knowledge of IP and its routing protocols: RIP, OSPF and BGP (interior and exterior BGPs);<br>• Basic concepts of Ethernet, Gigabit Ethernet and Spanning Tree Protocol (STP); |

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| | • Basic concepts of MPLS and Implementation of QoS and Differentiated Services in MPLS networks, Traffic Engineering in MPLS and MPLS based VPNs;<br>• Multi-service MPLS and carriage of Layer 2 services over MPLS;<br>• In depth knowledge of VPNs with main focus on Layer 2 based VPNs services like VPLS and VPWS. |
| **Assessment:** | A mid-term exam of 20%, project and presentation 30% and a final exam of 50%. This final exam is a hurdle. A student must pass the exam to pass the subject. |
| **Prescribed Texts:** | Textbook: Bruce Davie and Yakov Rekhter, " “MPLS Technology and Applications", Morgan Kaufmann Publication, ISBN: 1-55860-656-4. Additional Reading: Raif O. Onvural, " “Asynchronous Transfer Mode Performance Issues", Artech House Publishers, ISBN: 0-89006-804-6. Suggested, not mandatory. |
| **Breadth Options:** | This subject is not available as a breadth subject. |
| **Fees Information:** | Subject EFTSL, Level, Discipline & Census Date, http://enrolment.unimelb.edu.au/fees |
| **Generic Skills:** | On completion of this subject, the students should have developed:<br>• critical and creative thinking, with an aptitude for continued self-directed learning;<br>• writing, problem-solving and communication skills;<br>• ability to evaluate and synthesise the research and professional literature;<br>• sense of intellectual curiosity;<br>• ability to interpret data and research results;<br>• sense of intellectual integrity and ethics of scholarship;<br>• ability to learn in a range of ways, including through information and communication technologies;<br>• capacity to confront unfamiliar problems;<br>• an ability to evaluate and synthesise the research and professional literature;<br>• advanced working skills in the application of computer systems and software and a receptiveness to the opportunities offered by new technologies;<br>• ability to manage competing demands on time, including self-directed project work. |
| **Related Course(s):** | Master of Telecommunications Engineering |